

TABLE 66

Worldwide R&D paid for by the company and others and performed by the company, by industry and company size: 2009–19

(Millions of U.S. dollars)

Industry and company size	NAICS code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All industries	21–23, 31–33, 42–81	336,571	338,451	359,490	374,916	396,352	416,343	429,174	457,591	484,740	543,369	597,420
Manufacturing industries	31–33	236,858	243,611	253,821	261,697	276,110	285,661	287,895	303,044	314,167	339,076	350,024
Food	311	4,916	D	5,589	5,163	6,335	6,136	6,058 i	5,824	5,424	5,459	5,015
Beverage and tobacco products	312	933	D	D	D	1,358	1,423	1,529	1,076 - 1,654	1,769	1,628	1,755
Textile, apparel, and leather products	313–16	519	522	656	605	759	734	818	1,247 i	1,131	1,223	1,061
Wood products	321	283	254	211	282	222	341 i	198	166 - 751	174	206	193
Paper	322	NA	1,665	769	858	1,022	880	867	943	1,594	1,013	1,165
Printing and related support activities	323	217	269	212	291 i	258 i	238	198 i	223 i	236	246	429 i
Petroleum and coal products	324	NA	D	1,281	D	327	298	252	312	377	1,460 - 1,463	1,477 - 1,481
Chemicals	325	64,442	72,610	72,068	70,218	74,551	79,428	80,961	84,612	90,236	101,132	115,631
Basic chemicals	3251	NA	2,671	5,166	3,400	3,336	3,633	3,677	536 - 5,694	3,101	3,046	3,102
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	NA	1,038	1,117	D	1,794	1,842	1,780	332 - 5,490	805	2,435	1,695
Pesticide, fertilizer, and other agricultural chemicals	3253	NA	D	2,049	D	1,966 i	2,042 i	3,405	0 - 5,157	1,864	1,782 - 1,797	2,272 - 2,297
Pharmaceuticals and medicines	3254	53,456	60,537	58,866	58,920	62,480	66,731	D	73,193	79,004	88,776	103,487
Soap, cleaning compound, and toilet preparation	3256	NA	3,285	3,386	3,212	3,358	3,501	D	3,589	3,699	3,567	3,517
Paint, coating, adhesive, and other chemicals	3255, 3259	NA	D	1,485	D	1,617	1,679 i	1,664	1,806 - 1,830	1,764	1,508 - 1,529	1,532 - 1,560
Plastics and rubber products	326	2,982	2,515	2,640	4,446	4,576	4,519	2,906	4,583	4,626	3,170	3,359
Nonmetallic mineral products	327	1,153 i	1,596	1,428	1,588 i	1,578	1,599	1,487	1,474	1,485	1,567 i	1,701 i
Primary metals	331	993	802	763	818	700	770	711	662	862	990	740
Fabricated metal products	332	2,174	1,818	1,993	1,949 i	2,303 i	2,329	2,467 i	2,273	2,405	2,533	3,163
Machinery	333	11,156	12,403	18,312	17,462	15,420	15,089	16,827	15,958	16,626	19,279	19,435
Agricultural implement	33311	NA	D	1,570	2,142	2,243	D	2,152	2,189	2,132	2,730	2,778
Semiconductor machinery	333242	NA	2,469	2,727	1,357	3,645	3,434	3,812	4,138	4,530	5,077	5,374
Engine, turbine, and power transmission equipment	3336	NA	D	D	D	1,795	2,894	2,920	2,484	2,577	3,418 - 3,440	1,931
Other machinery	other 333	NA	6,566	D	D	7,736	D	7,943	7,147	7,387	8,030 - 8,057	9,353
Computer and electronic products	334	68,772	75,345	79,145	87,406	90,114	94,199	92,860	98,319	101,910	112,188	112,180
Communications equipment	3342	NA	17,069	15,197	18,877	20,392	22,048	23,049	16,124	15,568	16,467	15,907 - 15,912

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Semiconductor and other electronic components	3344	26,082	29,354	32,146	38,300	40,611	42,028	40,348	41,789	41,362	45,795	48,189 i
Navigational, measuring, electromedical, and control instruments	3345	16,498	17,905	18,242	18,640	18,046	18,993	17,020	18,112	17,965	20,828	21,512
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	NA	4,548	4,987	4,999	2,837	5,049	3,599	3,553	3,702	1,167 - 14,309 i	4,621 i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	NA	8,769	8,641	8,312	8,753	8,486	8,033	8,372	8,347	0 - 13,142	10,541
Other measuring and controlling device	other 3345	NA	4,588	4,615	5,329	6,456	5,458	5,387	6,187	5,916	6,520	6,350
Other computer and electronic products	other 334	NA	11,017	13,559	11,589	11,065	11,130	12,443	22,294	27,016	29,099	26,567 - 26,571
Electrical equipment, appliances, and components	335	4,475	4,767	5,319	4,140	5,738	5,705	5,710	6,207	6,154	6,179	7,006
Transportation equipment	336	56,183	51,362	49,030	50,415	51,547	56,597	57,698	60,161	59,432	59,850	53,187
Motor vehicles, bodies, trailers, and parts	3361–63	NA	17,764	D	D	23,610	D	25,735	6,671 - 54,230	30,069	31,869 - 31,899	31,110
Aerospace products and parts	3364	36,409	31,627	26,858	D	25,684	D	29,113	3,240 - 50,799	26,189	25,006	18,943 i
Aircraft, aircraft engine, and aircraft parts	336411–13	NA	D	D	D	D	D	27,463	1,812 - 49,371	24,666	23,683	17,476 i
Guided missile, space vehicle, and related parts	336414–15, 336419	NA	D	D	1,425	D	D	1,649 i	1,428 i	1,523	1,323	1,467
Military armored vehicle, tank, and tank component	336992	NA	D	52	D	9 i	D	16	3 - 38	9	11	35
Other transportation	other 336	NA	D	D	D	2,245	D	2,834	2,653 - 2,690 i	3,164	2,936 - 2,961	3,099
Furniture and related products	337	433	407	347	383	401	422	477	381	470	418 - 444	444
Miscellaneous	339	NA	9,528	D	D	18,900	14,951	15,869	18,045	19,257	20,515	22,077 - 22,084
Medical equipment and supplies	3391	NA	7,461	D	10,311	15,938	12,091	13,166	15,387 - 15,400	16,470	17,443	19,083
Other miscellaneous manufacturing	3399	NA	2,066	D	D	2,962	2,860	2,703 i	2,646 - 2,657 i	2,788	3,072	2,995 - 3,002
Nonmanufacturing industries	21–23, 42–81	99,713	94,840	105,669	113,220	120,242	130,682	141,279	154,547	170,574	204,293	247,396
Mining, quarrying, oil and gas extraction, and support activities	21	NA	2,785	2,597	D	4,452	D	4,348	3,604	3,647	1,990	3,307
Utilities	22	NA	442	396	368	317	314	483	353	336	283	284

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Wholesale trade	42	NA	1,145	1,697	i 2,165	i 459	i D	1,723	i 489	i 0 - 12,105	883	i 1,304
Electronic shopping and electronic auctions	454111–12	NA	D	D	D	1,845	D	D	0 - 14,624	0 - 12,105	11,715 - 15,515	i 3,200 - 20,013
Transportation and warehousing	48–49	NA	124	159	186	D	692	416	495	1,221	2,562	i 9,952
Information	51	43,197	45,099	52,341	56,815	68,375	78,013	77,965	84,400	94,412	111,653	129,277
Publishing	511	33,171	33,883	36,310	36,947	43,821	46,806	42,190	42,156	42,368	39,890	39,968
Newspaper, periodical, book, and directory publishers	5111	NA	826	401	221	i 348	i 92	i 107	i 84	i 72	150	61
Software publishers	5112	NA	33,058	35,910	36,726	43,473	46,714	42,083	42,073	42,296	39,739	39,907
Telecommunications	517	1,609	2,043	2,267	2,787	i 3,112	3,830	3,648	3,617 - 3,659	3,828	3,827 - 3,833	3,856
Data processing, hosting, and related services	518	3,008	2,895	5,450	5,574	7,787	10,356	10,600	14,051 - 14,099	18,893	28,214 - 28,226	36,449
Other information	other 51	5,410	6,278	8,313	11,506	13,654	17,022	21,526	24,530	29,323	39,713	49,004
Finance and insurance	52	NA	2,568	3,943	4,159	4,999	4,748	6,359	8,468	8,582	8,347	10,092
Real estate and rental and leasing	53	NA	367	D	400	202	268	313	477	892	1,072	1,476
Lessors of nonfinancial intangible assets (except copyrighted works)	533	NA	NA	365	379	D	58	D	27	77	6	48
Other real estate and rental and leasing	other 53	NA	NA	D	21	i D	210	D	450	814	1,066	1,427
Professional, scientific, and technical services	54	47,709	37,108	39,731	40,843	37,345	37,995	i 46,255	39,585 - 54,209	46,587	58,333	68,023
Architectural, engineering, and related services	5413	3,384	4,156	D	2,541	i 3,173	3,374	4,158	i 56 - 9,557	2,575	4,005	4,244
Computer systems design and related services	5415	15,310	12,458	13,181	13,404	i 10,535	i 12,579	i 17,227	15,483 - 20,617	17,190	20,378	26,416
Scientific research and development services	5417	19,307	16,408	19,295	20,225	18,478	17,870	20,630	20,194	22,635	28,620	30,675
Research and development in biotechnology	541711	8,492	6,266	7,985	8,364	5,889	4,898	7,114	i 6,062	6,076	8,428 - 8,442	9,250
Research and development in the physical, engineering, and life sciences (except biotechnology)	541712	10,129	9,591	10,697	11,261	11,794	12,291	12,807	13,409	15,680	19,507	20,651
Research and development in the social sciences and humanities	541720	686	551	613	600	795	682	709	723	879	672 - 683	774
Other professional, scientific, and technical services	other 54	9,708	4,086	D	4,674	5,158	4,172	i 4,240	3,852	4,188	5,330	6,688
Health care services	621–23	NA	D	D	708	i 535	i 501	i 771	i 1,002	1,132	1,497	2,289

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Other nonmanufacturing	23, 44–45 (excluding 454111–12), 55–56, 624, 71– 72, 81	NA	NA	D	D	D	D	D	1,054 - 6,188 i	1,665	2,162 - 5,963	1,382 - 18,191
All companies (number of domestic employees)	–	336,571	338,451	359,490	374,916	396,352	416,343	429,174	457,591	484,740	543,369	597,420
Micro companies ^a												
5–9	–	NA	3,792	4,143	3,025 i	3,442 i	3,409 i	3,101 i	1,728 i	NA	NA	NA
Small companies												
10–19	–	NA	NA	NA	NA	NA	NA	5,750 i	5,031 i	3,532	4,511	5,639
20–49	–	NA	NA	NA	NA	NA	NA	10,654 i	9,972	9,513	11,825	12,875
Medium companies												
50–99	–	13,785	9,470	9,834	9,728	9,289	10,677	11,946	9,639	10,635	13,095	14,758
100–249	–	14,365	12,989	13,354	13,665	14,980	15,081	14,964	16,160	18,584	20,486	21,986
Large companies												
250–499	–	12,315	11,439	14,573	12,693	13,379	13,675	14,837	14,751	16,522	21,971	21,592
500–999	–	12,124	11,794	11,388	12,955	13,663	15,422	17,442	16,601	20,173	20,309	26,922
1,000–4,999	–	54,600	60,782	63,801	62,729	69,212	71,679	71,259	79,017	79,494	83,959	92,224
5,000–9,999	–	27,461	34,453	32,578	41,006	43,087	51,305	48,399	49,479	54,572	61,047	62,775
10,000–24,999	–	61,681	50,710	61,593	60,544	60,844	63,818	70,864	81,547	87,965	108,249	111,876
25,000 or more	–	118,424	125,067	132,719	144,097	152,547	155,180	159,959	173,666	183,750	197,916	226,773

D = data withheld to avoid disclosing operations of individual companies; i = > 50% of the estimate is a combination of imputation and reweighting to account for nonresponse; NA = not available.

NAICS = 2012 North American Industry Classification System.

^a Business Enterprise Research and Development Survey did not include companies with fewer than 5 domestic employees from 2008–16 and does not include fewer than 10 domestic employees beginning in 2017.**Note(s):**

Detail may not add to total because of rounding. Industry classification is based on the dominant business code for domestic R&D performance, where available. For companies that did not report business codes, the classification used for sampling was assigned. Beginning in survey year 2018, statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&D. This change has affected the comparability of these estimates with estimates published for years prior to 2018. For survey years 2009–13, industry classification was based on the 2007 NAICS. Beginning with survey year 2011, the composition of the Other nonmanufacturing industry changed. Most statistics for years prior to 2019 have been revised since original publication. Revised statistics include adjustments based on information obtained after the original statistics were prepared. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey.